Transportation Knowledge Networks

Leni Oman
Director
Office of Research & Library Services
Chair
AASHTO RAC TKN Task Force

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Challenges

- Increasing retirements
- Changing demographics
- Unique knowledge
- Doing more with less
What is Knowledge Management?

• The systematic processes by which knowledge needed for an organization to succeed is created, captured, shared, and leveraged.

  *The Complete Idiot’s Guide to Knowledge Management*

• Getting people the information they need, in the form they need it, when they need it.
Types of Knowledge

**What individuals know**

**Know how to do**

- **HUMAN**
  - *Explicit*
    - Can write down
  - *Tacit*
    - Don’t know you know

**Relationships between individuals/within groups**

- **SOCIAL**
  - *Explicit*
    - Collective understanding of how things are done
  - *Tacit*
    - Can write down

- **STRUCTURAL**
  - Embedded in systems, processes, tools & routines

- **CULTURAL**
  - Embedded in systems, processes, tools & routines

"Collective understanding of how things are done"
A Knowledge Retention Culture

Human Resources
- Risk identification
- Succession planning/career development processes
- Building a retention culture
- Policies to retain workers

Knowledge Transfer
- Documentation
- Interviews/Debriefing
- Training
- Social Networks

Information Infrastructure
- Technologies that intensify collaboration
- E-learning applications
- Support for problem solving
- Findability

Knowledge Recovery
- Using retirees effectively
- Outsourcing
- Regenerating knowledge
TRB Special Report 284

Recommendations

- Proposed a network of Transportation Knowledge Networks with a National Coordinating Structure

- Need for a strong governing body to provide policy, oversight, and advocacy

- Seek broad-based funding support to sustain operations.
  - Provide federal grants for start up
  - Grow federal funds
  - Develop local match


Transportation Research Board of the National Academies 2006
The Vision for Information

An employee, working at their desk needs information they don’t have…

- Because of good marketing in the agency, they know where to turn to get the information.
  - They open their Internet browser to the Information portal and find a user-friendly menu of options.
  - They choose the service they are looking for such as a literature review; facts on file; agency templates; access to a database; etc…
The Employee finds a User-Friendly Portal

- If they are searching for documents or data, the front end application asks them how they want to search for information –
  - geographically, topically, by title/author, or other formats.
  - This interface is visually engaging and easy to use.
  - With a click, they are taken to that search tool/aid (or they are all on the first page).
  - They type in their search phrase or point and click to icons and retrieve information. The databases/systems which are being searched is not belabored but are noted while the search is underway (Now searching BIOSIS...)

Cooperating Libraries of Olympia, listing

WSDOT Traveler Information System
The Portal Tools Help Refine the Search

- Can select output: narrative, tabular, geospatial data, or all. To help refine the search questions our librarians typically ask are programmed into the system.

- The results are provided in good English without cryptic abbreviations.

- When the site includes data references, the data platform, relevant uses, authorized users are identified.

- Once they find the data they want, they can save information under a custom account.
Information is Accessible

- Documents/data can be retrieved by point and click on the retrieved search list and the application highlights the specific text relevant to their search.

- Because the documents and data are tagged, they are able to find specifically what they're looking for.

- The behind the scenes effort to obtain, catalog, index/tag, store information is not obvious.

- The employee is able to pull quotes for the documents with prompts to help them understand copyright laws and appropriate uses/references.
Most of the Time…

- If a document is not available electronically, the user is offered a menu for delivery
  - Interlibrary loan
  - Electronic document deliver
  - Purchase of paper copies

This document is available to the public through the National Technical Information Service, Springfield, VA 22616.
Special Report 284

Next Steps

- Develop a business plan
- Determine which office should manage the coordinating structure.
- Provide a strong governance body for the coordinating structure.
Implementing Transportation Knowledge Networks (NCHRP 20-75)

• Follow up project funded in 2007
• Creates a business plan that:
  – Frames the problem
  – Describes potential solutions
  – Helps communicate the value of a Transportation Knowledge Network
• Principal Investigator:
  – Frances Harrison, Spy Pond Partners
  – http://www.cts.umn.edu/Research/Featured/NCHRP20-75/
A survey of SCOH members was conducted in May of 2008. 85% of the respondents thought a TKN would add value for transportation agencies.
Key Findings – Desired TKN products & services

• One stop shopping for transportation information
• Improved search tools
• Value-added services to filter & annotate information (address information overload)
• Peer-to-peer sharing of best practices
• Capture of “missing” information resources
• Greater access to digital documents
• Cataloging to enable sharing of documents across organizations
• Preservation of information resources to ensure continuing availability
Key Findings
Recommended Approach to Implementing TKNs

- Employ a mix of strategies – no single element alone will be effective
- Emphasize role of the National coordination function, clarify role of the regional TKNs
- Use “hot topics” and innovation to demonstrate value
- Emphasize efficiency benefits
- Incorporate both centralized and decentralized elements
- Establish clear accountability
NCHRP 20-75 Business Plan

• Context Section
• Background
• Mission, Goals and Objectives
• Market
• Products and Services
• Stewardship Model

• Costs – $13.5 million per year
  – $7.9 mill for content
  – $3.1 mill technical/administrative infrastructure
  – $1.5 mill outreach/education
  – $1 mill research/literature review services

• Funding Source
  http://www.cts.umn.edu/Research/Featured/NCHRP20-75/businessplan.html
Overview of TKN Products & Services

Transportation Information Portal
(provided by national TKN coordination function – components available for incorporation into other web pages)

- Find Information
- Ask a Question
- Event Calendar
- Find a Person
- News
- Transportation Topics
- Submit a Resource
- Research in Progress
- Communities of Practice

Information Resources & Tools
(Responsibility for coordination, contributions and maintenance shared across TKNs/Information Providers)

- US DOT
  RITA, Modal Admins
- TRB
  (TRIS, RiP, Needs)
- AASHTO
- State DOTs
- MPOs
- Universities
- Industry, Non-Profits
- Library Resources
  OCLC, TLeCat, First Search

- Other Federal Agencies
- GIS Data
- Tabular Datasets
- Standards & Guidelines
- Manuals
- Directories
- Images & Video

- Tutorials
- Legislation
- Lessons Learned
- Events
- Performance Data
- Commercial Databases

Knowledge Services & Protocols
(Resource archiving, digitization, cataloging, bulk purchasing, interlibrary loan)

- Standards & Crosswalks
  (metadata, thesaurus, taxonomy)
The TKN Ten Products and Services

1. National Digital Repository
2. National Print Repository
3. National Transportation Portal with Federated Search
4. Information Modules
5. Research/Literature Review Services
6. Standards Coordination & Thesaurus
7. Targeted Collection & Digitization Efforts
8. Information Provider Outreach, Coordination and Communication
9. Library Connectivity Support and Advocacy
10. User Outreach & Education
Recommended Next Steps

1. Continue broad outreach
2. Continue to expand the communications toolkit
3. Use NCHRP (20-75A) *Directory of Transportation Libraries and Information Centers* - to extend the TKN and awareness of the TKN initiative.
4. Encourage state champions to meet with senior management to brief them on the TKN initiative and its potential benefits
More from NCHRP 20-75

One-page summary of project
Listen to testimonials
View & Listen to an overview presentation as a PDF

And much more:
http://www.cts.umn.edu/Research/Featured/NCHRP20-75/
Transportation Knowledge Networks

Western
TKN
9 States
16 Orgs

Midwest
TKN
9 States
15 Orgs

Eastern
TKN
6 States
13 Orgs

http://ntl.bts.gov/networking/national.html
AASHTO Research Advisory Committee on Transportation Knowledge Networks Task Force

Goal

Serves as a forum to develop the concept, understanding, and application of transportation knowledge networks for the transportation sector. The AASHTO RAC TKN TF advocates and supports the rapid and efficient exchange of information resources through development of strategies and the innovative use of technology.
Task Group Membership

1. AASHTO RAC Region 1 – 2 members (Massachusetts & Vacant)
2. AASHTO RAC Region 2 – 2 members (Virginia & Louisiana)
3. AASHTO RAC Region 3 – 2 members (Kansas & Wisconsin)
4. AASHTO RAC Region 4 – 2 members (Washington & Oklahoma)
5. Research and Innovative Technology Administration, National Transportation Library
6. Federal Highway Administration
7. Transportation Research Board
8. Council University Transportation Center
9. Special Library Association Transportation Division
10. Eastern TKN
11. Midwestern TKN
12. Western TKN
13. TRB Committee on Library and Information Science for Transportation
TKN TF Goals

1. Support the formation of the transportation knowledge network to address business needs.

2. Advocate for an effective TKN and supporting information infrastructure.

3. Enhance knowledge exchange within the transportation community.

4. Develop strategies to actively monitor, support, and encourage methods for effective creation, capture, synthesis, transfer, application, and preservation of transportation knowledge.
TKN TF 2009 Activities

1) Articulate the concept and value of knowledge networks and quality library and information services.
   • Before and after descriptions

2) Explore and Advocate for sustained funding.
   • AASHTO Reauthorization request

3) Describe a successful TKN model for transportation, including definitions of best practices.

4) Develop strategies to capture knowledge and retain institutional memory from retiring and other departing employees.
How Can AASHTO IS Help?

• Participation in building the vision
  – Best technology and data strategies
  – Metadata
• Advocacy
• Joint leadership?
• Success stories – ROI
• Work the vision
• Other ideas?
A Special Note on Findability

• Not easy to find the information.
• Internet searches only access ~16% of available information resources
• Full text searching doesn’t find most related terms
• Version control management challenges
• “Hidden” communities
How Do We Compare?

• National Library of Medicine
  – MeSH 23,000 terms,
  – >150K supplementary records, thousands of cross references
  – 11 staff managing the thesaurus
  – Index over 4800 professional journals
  – PubMed and MedLinePlus
• National Agricultural Library
  – NALT >68,500 terms
  – 7 staff managing the thesaurus
  – Have indexed over 4 million records
  – Custom user interfaces
• National Transportation Library
  – TRT <10,000 terms
  – Indexing is a part time duty between 4 FTE
  – 600,000 records in TRIS
  – Very limited customer user interfaces
Metadata & the TRT

While we’re waiting for the semantic web…

– Common metadata to help us find relevant, related information regardless of source
– Uses & limits of “machine language”
– Common language

“I am hoping that someday a portal would be developed that would prompt the user for keywords AND decisions which would help to refine the quest into a more defined and narrow search.”
Why Add Library Science?

- Experience describing information and documenting it
- Familiarity with user queries
- Familiarity with search techniques and experiences
- Centuries of knowledge development
Reauthorization

AASHTO Standing Committee on Research and CEO Board of Directors approved a recommendation for reauthorization to establish a Transportation Knowledge Network

- Facilitate the development and implementation of Transportation Knowledge Networks
- Broaden the mission of the National Transportation Library
- Establish an advisory committee on transportation information
- Proposed Funding Level: $13.5 million per year

AASHTO Reauthorization request
The Time *is* Right

With revenues tightening efficient access to information is even more important.
- Saves time
- Saves money
- Improves decision support
- Helps us communicate with constituents

Wisdom: The capacity to choose worthwhile objectives
Knowledge: The ability to use information to achieve objectives
Information: Structured data
Data: Pure and simple facts
http://www.systems-thinking.org/dikw/dikw.htm
Resources

• Federal Knowledge Management Working Group  
  http://wiki.nasa.gov/cm/wiki/?id=1926
• AASHTO RAC TKN Task Force  
  http://cms.transportation.org/?siteid=55&pageid=2449
• Lost Knowledge: Confronting the Threat of an Aging Workforce  
  David W. DeLong
• Ambient Findability: What We Find Changes Who We Become  
  Peter Morville
• Complete Idiot's Guide to Knowledge Management  
  Melissie Clemmons Rumizen
• Driving Results Through Social Networks: How Top Organizations Leverage Networks for Performance and Growth  
  Rob Cross and Robert J. Thomas
Contact Information

Leni Oman
Director, Office of Research and Library Services
Washington State Department of Transportation
OmanL@wsdot.wa.gov
360-705-7974